Preventing Pesticide Illness

California's Pesticide Illness Surveillance Program

The mission of the Department of Pesticide Regulation is to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management.

CALIFORNIA'S PESTICIDE regulatory program has tracked pesticide-related illnesses since the early 1970s. Illness records help the California Department of Pesticide Regulation (DPR) document and evaluate situations in which pesticides cause injury and illness. Information from this database – known as the Pesticide Illness Surveillance Program – then feeds back into DPR regulatory programs for action on possible pesticide-related problems.

The Pesticide Illness Surveillance Program helps DPR reevaluate pesticide registrations and modify use practices to enhance protection for people and the environment. Scientists at DPR and the U.S. Environmental Protection Agency (U.S. EPA) also use the information to improve safety information on pesticide labels. Illness investigations help focus enforcement attention on potential problem areas for all types of pesticides, which include insecticides, herbicides, fungicides, fumigants, rodenticides, repellents, disinfectants, and any other substance intended to control harmful organisms.

DPR's Worker Health and Safety Program, widely regarded as the most demanding in the nation, makes illness monitoring a priority. In March 2000, the U.S. General Accounting Office concluded that "comprehensive information on the occurrence of acute and chronic health effects due to pesticide exposure does not exist." The report that reaches that conclusion identifies the California Pesticide Illness Surveillance Program as one of four important sources of information on pesticide toxicity, and references a 1993 report by the U.S. General Accounting Office that describes the California program as "by far the most effective and well-established monitoring system".

DPR's surveillance program applies a broad definition to the term pesticide-related. If health effects appear to derive from exposure to any component of a pesticide product, including inert ingredients, impurities, and breakdown products, the surveillance program attributes those health effects to that pesticide product. Similarly, reporting includes but is not limited to toxic effects similar to those seen in pests. For example, a product designed to disrupt insect nerve function may, at excessive levels, cause neurologic symptoms in humans. The surveillance program records such cases, and also records cases in which contact with a pesticide causes local irritant effects such as rashes or inflammation of the eyes. Pesticides may act as irritants or allergens, through their odor, or by resulting in fires or explosions. These effects are all recognized as potential causes of illness or injury, along with the toxic impact of pesticide active ingredients.

Data Sources

Since 1971, California law has required that doctors contact their local health department whenever they suspect an illness or injury is related to pesticide exposure. The health

department then alerts the county agricultural commissioner and also completes a Pesticide Illness Report.

Copies of this report are sent to Cal/EPA's Office of Environmental Health Hazard Assessment, the California Department of Industrial Relations (DIR), and to DPR.

Physicians often do not report potential pesticide illnesses. (See below for information on DPR's program to improve physician reporting.) For that reason, DPR's Worker Health and Safety Branch also reviews illness reports submitted to the State workers' compensation system. Investigations begin when a report mentions a specific pesticide – or pesticides in general - as a possible cause of injury. (Reports that cite unspecified chemicals also prompt investigation if the incident occurs in a setting associated with pesticide use.)

There are some limitations on this data. For instance, heavy reliance on reports from the workers' compensation system inevitably biases the surveillance program toward occupational exposures. People injured off the job, or who fail to seek medical care after pesticide exposures, are unlikely to make it into the system.

Reporting aspects of the program also tend to emphasize acute rather than chronic illnesses related to pesticide exposures. (Acute illnesses are short-term reactions to pesticide exposure. Chronic illnesses are long-lasting or recur frequently.) Therefore, data should not be used to draw conclusions about the total number of pesticide illnesses.

California has "by far the most effective and well-established (pesticide illness) monitoring system..." in the nation.

U.S. General Accounting Office, 1993

The likelihood is very good, however, that acute illnesses treated under workers' compensation will be reported to DIR, reviewed by DPR staff, and recognized as pesticide-related cases. Since intense and prolonged exposures typically occur in the workplace, such data allows DPR to identity illness trends associated with pesticide use.

Improving Physician Reporting

DPR has longstanding concerns about delays in receiving illness reports. To deal with the problem, DPR began a project in 1994 to familiarize physicians with the State law that requires them to immediately report pesticide illnesses to local health officers.

Working with the Department of Industrial Relations, DPR sent summaries of the reporting requirements to all of the more than 70,000 licensed physicians in the State. During 1995 and 1996, DPR sent notification letters to doctors who filed reports of pesticide illnesses with the workers' compensation system but did not alert their local health officers.

At the same time, Cal/EPA's Office of Environmental Health Hazard Assessment conducted outreach training for physicians in three counties, stressing the importance of reporting suspected pesticide cases.

These initiatives have shown tangible results. In 1994, physicians had reported only 15 percent of cases detected by the illness surveillance program. By 1997, physician reports jumped to 30 percent of the total number of cases identified.

Since this project was very resource-intensive, DPR looked for other ways to improve physician reporting. The U.S. EPA supplied funding to help develop a project with the California Poison Control System (CPCS). If a consulting physician contacts CPCS about a pesticide-related case, CPCS will offer to report the case for the physician. DPR conducted a pilot study with mixed results. DPR received notices about cases very soon after exposure. However, some misunderstandings between DPR and CPCS resulted in fewer reports by CPCS than expected. Another one-year reporting trial with CPCS is underway.

The Investigative Process

County agricultural commissioners investigate all cases within their jurisdictions, whether identified by physician reports or DPR's review of workers' compensation reports. DPR provides commissioners with instruction, guidance, oversight, and technical support.

After commissioners complete their investigations, they prepare reports describing the circumstances under which pesticide exposure may have occurred and other relevant information. They may also assess fines and other penalties, if circumstances warrant. Depending upon the circumstances and severity of the incident, DPR may also take its own enforcement actions to protect public health and the environment.

Commissioners send their completed reports to DPR's Worker Health and Safety Branch where they are evaluated and categorized to determine illness trends and potential areas for further investigation. Individual reports may vary. Sometimes, a specific pesticide or pesticides cannot be identified. Other factors may include presence or absence of witnesses, the quality and quantity of physical evidence (such as residues), and the time that elapses between an incident and subsequent investigation. Therefore, DPR categorizes reports on the degree of relationship between pesticide exposure and illness or injury, using the following criteria:

- **Definite.** Signs and symptoms exhibited by the victim would be expected to result from the reported exposure. Physical evidence (e.g., leaf samples or contaminated clothing) documents exposure and medical evidence (blood or allergy tests) demonstrates that the symptoms derive from the exposure. Since most cases are identified through the workers' compensation system weeks or months after the incident, reports by a competent observer, such as a physician, are accepted as evidence.
- **Probable.** More limited evidence suggests a relationship between the pattern of exposure and the illness or injury, despite ambiguous or missing medical and/or physical evidence.
- **Possible.** Information may be ambiguous, although there is some correlation between the suspected pesticide and the illness or injury. For example, headaches, nausea and skin rashes could be related to sources other than pesticides.
- **Unlikely.** Signs and symptoms reported are not typical for suspected exposure, but the possibility of pesticide illness or injury cannot be ruled out.
- **Unrelated.** Evidence demonstrates the illness or injury was caused by factors other than pesticides.
- **Asymptomatic.** Although no injury or illness may result, some observations still indicate that a worrisome exposure occurred. For example, activity levels of cholinesterase – an enzyme that helps regulate nerve function – may be depressed by exposure to certain pesticides. Depending on the circumstances, this may not result in overt symptoms of illness. However, detection of depressed cholinesterase activity, like identification of other pesticide-related illnesses, may trigger review of workplace practices or require a halt to work exposure.
- **Indirect.** The illness or injury is attributed to measures taken to avoid exposure, such as heat stress caused by labor in heavy protective clothing.

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Using Illness Information

Portions of the reports generated by the Pesticide Illness Surveillance Program are subject to medical patient privacy laws. Most of the information, however, is available to the public. DPR's Worker Health and Safety Branch maintains it in a relational database for analysis and use by Department staff. The database is used to respond to queries from members of the public, community groups, other government agencies and regulated individuals and industries.

One of the most frequent queries involves specific pesticides or active ingredients. Such chemicals may be enumerated by illness or injury, summarized by individual counties, or totaled statewide. Other queries concern the frequency with which pesticides are identified in illness investigations and the types of health effects reported (eye, skin, respiratory, systemic, and combinations of these categories). For any query, the system can report whether incidents occurred as a result of agricultural or non-agricultural pesticide applications, and if the illness or injury required hospitalization or resulted in lost work time.

Here are some categories in which illness data may be sorted and analyzed:

- By specific pesticide and type of pesticide (antimicrobials, cholinesterase inhibitors, other)
- By type of illness (systemic, eye, skin, eye and skin, respiratory)
- By degree of relationship (definite, probable, possible, etc.)
- By occupational or non-occupational exposure
- By type of exposure. These include pesticide drift, via residue, by direct spray or squirt, by spill or other direct contact, by ingestion, or other/multiple unknown mechanisms.
- By work activity (ground applicator, aerial mixer/loader, chamber fumigation, etc.)
- By agricultural and non-agricultural pesticide use
- By individual counties, or statewide
- By age group and sex
- By date and year

Depending upon the complexity of individual queries, DPR may charge a nominal fee to cover the costs of preparing data.

The annual summary reports and selected summary tables are available on DPR's Web site, www.cdpr.ca.gov. DPR's long-term goal is to have an online query-based system.

For more information on data queries, contact:

Dr. Louise Mehler
(916) 445-4190
lmehler@cdpr.ca.gov

Dr. Marylou Verder-Carlos
(916) 324-4204
mverder@cdpr.ca.gov

or write to the

DPR Pesticide Illness Surveillance Program
1001 I Street
P.O. Box 4015
Sacramento, CA 95812-4015.

Single copies of this handout are available by calling 916-445-4222, or can be downloaded from DPR's Web site, www.cdpr.ca.gov, "News and Publications," then to "Consumer Information."